

# The clinical effectiveness of diabetes education models for Type 2 diabetes: a systematic review

E Loveman,<sup>\*</sup> GK Frampton and AJ Clegg

Southampton Health Technology Assessments Centre (SHTAC),  
Wessex Institute for Health Research and Development (WIHRD),  
University of Southampton, UK

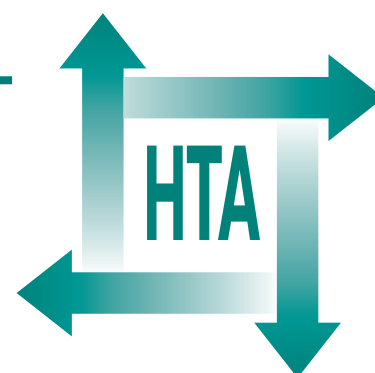
\* Corresponding author



## Executive summary

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## Executive summary

### Background

Diabetes is a chronic and progressive disorder that has an impact on almost every aspect of life. Type 2 diabetes is characterised by insulin resistance and relative insulin deficiency. It is commonly linked to being overweight or obese, and to physical inactivity. Type 2 diabetes primarily affects people over the age of 40 years and is becoming more common.

The basic targets in the treatment of diabetes are the normalisation of blood glucose levels, blood pressure control and lipid management, and studies have shown that good diabetic control is associated with a significant reduction in the risk of a number of complications. Control of diabetes is affected by both lifestyle factors and by pharmacological treatments and the management of diabetes is largely the responsibility of those affected. Supporting self-care is a crucial aspect of any diabetes service, and national guidance recommends structured education as fundamental to this.

The aim of patient education is to empower patients by improving knowledge, skills and confidence, enabling them to take increasing control of their condition. Structured educational programmes for diabetes self-management are often multifaceted interventions providing information and also management skills around diet, exercise, self-monitoring and medication use.

This review is an update of a previous systematic review which concluded that the diversity of the educational programmes for Type 2 diabetes did not yield consistent results. Some of the included trials reported significant improvements in metabolic control and/or quality of life or other psychological outcomes; however, many others did not report significant effects of educational interventions.

### Objective

The objective was to examine the clinical effectiveness of patient-education models for adults with Type 2 diabetes.

### Methods

A systematic review of the literature on educational methods in diabetes was undertaken. This was an update of a previous systematic review.

#### Data sources

Electronic databases (including Cochrane Library, MEDLINE, PsychINFO) were searched from 2002 to January 2007. Bibliographies of included studies and related papers were checked for relevant studies. Experts were contacted for advice and peer review, and to identify additional studies.

#### Study selection

A total of 1696 titles and abstracts were screened for eligibility by one reviewer and checked by a second. Inclusion criteria were applied to the full text of selected papers by two reviewers, with differences resolved through discussion. Studies were included if they fulfilled the following criteria:

- Interventions: educational interventions compared with usual care or another educational intervention.
- Participants: adults with Type 2 diabetes mellitus.
- Outcomes: must report glycated haemoglobin, hypoglycaemic episodes, diabetic complications, or quality of life. Other reported outcomes from included studies were discussed.
- Evaluation of outcomes  $\geq 12$  months from inception of intervention.
- Design: randomised controlled trials (RCTs) and controlled clinical trials (CCTs) with a concurrent control were included.
- Reporting: studies were only included if they reported sufficient detail of the intervention to be reproducible (e.g. topics covered, who provided the education, how many sessions were available).

Studies in non-English languages or available only as abstracts were excluded.

#### Data extraction and quality assessment

Data extraction and quality assessment were undertaken by one reviewer and checked by a second, with differences resolved through discussion. The quality of included studies was assessed using criteria set by the NHS Centre for Reviews and Dissemination.

## Data synthesis

The clinical effectiveness data were synthesised through a narrative review with full tabulation of results. Meta-analysis was not undertaken due to differences in study populations and comparators.

## Results

### Number and quality of studies

Including studies identified in the previous systematic review, 13 published studies (11 RCTs, two CCTs) were identified that provided education on multiple aspects of diabetes self-management and eight studies (seven RCTs, one CCT) were identified that provided education that was focused on a particular aspect of self-management. The quality of reporting and methodology of the studies was variable.

### Summary of benefits

Studies of multi-component educational interventions yielded mixed results. Some trials reported significant improvements on measures of diabetic control but others did not. Positive effects may be attributable to longer-term interventions with a shorter duration between the end of the intervention and the follow-up evaluation point. There may also be an effect of having a multi-professional team delivering the educational programme.

Studies of focused educational interventions did not yield consistent results. Some effects were shown on measures of diabetic control in studies that focused on diet or exercise alone. Although the effects shown were generally small, those that were present did appear to be relatively long-lasting. This update review does not substantially alter the conclusions of the previous systematic review; for each outcome, the proportion of studies that demonstrated significant effects of education was similar.

## Discussion

Overall, the results of educational interventions aimed at patients with Type 2 diabetes are difficult to interpret due to differences in the interventions, the populations, the study designs and the outcomes reported. There is little evidence to suggest whether and how educational programmes might currently be directed to achieve maximal benefit for patients with Type 2 diabetes. Multi-component educational interventions appear to have better effects on outcomes than those focused on particular aspects of diabetes self-care alone, and this is currently reflected in national guidance for diabetes education.

There are a number of issues around the complexity of the intervention, the possibility of confounding, and methodological issues around study designs which need to be taken into account in any interpretation of the results of this review.

The review has a number of strengths which should minimise bias: a research protocol defined the research question and the inclusion criteria; consistent methods of critical appraisal were applied; and the work was informed by an advisory group. Limitations of the review are that, owing to time and resource restrictions, authors of trials were not contacted for further information. Also, perhaps due to publishing word length limits in the primary literature, details of some trials were not reported. It is unlikely, however, that these limitations would have made a difference to the overall results of the review.

## Conclusions

### Implications for service provision

Based on the evidence reviewed in this report, it would seem that education delivered by a team of educators, with some degree of reinforcement of that education made at additional points of contact, may provide the best opportunity for improvements in patient outcomes. Educators need to have time and resources to fulfil the needs of any structured educational programme. There is also a need for education to have a clear programme at the outset. From the evidence reported it is unclear what resources would need to be directed at the educators themselves to ensure that they can deliver programmes successfully.

### Recommendations for further research

Any future research should consider patient education within the context of overall diabetes care and as such follow guidelines for the development and evaluation of complex interventions. Good-quality, longer-term studies would be desirable but these would require careful consideration around the nature of any control group. Information is needed to clarify the sensitivity of diabetes education programmes to the performance of the diabetes educators, in order to ensure success and cost-effectiveness of education programmes.

## Publication

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# NIHR Health Technology Assessment Programme

The Health Technology Assessment (HTA) Programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The research findings from the HTA Programme directly influence decision-making bodies such as the National Institute for Health and Clinical Excellence (NICE) and the National Screening Committee (NSC). HTA findings also help to improve the quality of clinical practice in the NHS indirectly in that they form a key component of the 'National Knowledge Service'.

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Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

The research reported in this issue of the journal was commissioned by the HTA Programme as project number 06/47/01. The contractual start date was in November 2006. The draft report began editorial review in May 2007 and was accepted for publication in October 2007. As the funder, by devising a commissioning brief, the HTA Programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

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